

## A New Species of Scaleworm, *Grubeulepis malayensis* (Annelida: Polychaeta: Eulepethidae), from Morib Beach, Malaysia, Living in Chaetopterid Tubes

Eijiroh Nishi

Coastal Museum of Natural History,  
Yoshio, Katsuura, Chiba, 299-5242 Japan

Present and corresponding address: Manazuru Marine Laboratory  
for Science Education, Yokohama National University,  
Iwa, Manazuru, Kanagawa, 259-0202 Japan  
E-mail: enishi@ynu.ac.jp

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A new species of eulepethid polychaete, *Grubeulepis malayensis*, is described. It lives in empty tubes of the chaetopterid polychaete *Mesochaetopterus selangolus* (Rullier, 1976) collected from a sandy beach at Morib Beach, near Kuala Lumpur, Malaysia. The species is distinguished by the lack of papillae on the first pair of elytra, possession of spinous notopodial hooks, and the presence of acicular neurochaetae on segments 2 to 5. It is unique in its genus in possessing a single pair of prostomial eyes and in having a short anal cirrus on the right side.

**Key Words:** Scaleworm, new species, Polychaeta, Eulepethidae, *Grubeulepis*, Malaysia, chaetopterid tubes.

### Introduction

Rullier (1976) established a new genus and species of Chaetopteridae, *Sasekumaria selangola* Rullier, 1976, from Morib Beach, Malaysia. This chaetopterid genus was considered unique because the body was thought to be divided into two regions rather than three as in all other genera in the Chaetopteridae. During my revisional work on the Chaetopteridae of Japan and adjacent areas, Dr. A. Sasekumar of the University of Malaya kindly sent me specimens of *S. selangola* with associated crabs and scaleworms. Based on these specimens and some of the type specimens studied by Rullier (1976), all of which have three body regions, I recently synonymized *Sasekumaria* with *Mesochaetopterus* (Nishi 1999). Rullier (1976) noted the presence of a porcellanid crab and a scaleworm in the tubes of *M. selangolus* (see also Petersen and Britayev 1997); later the crab was described as a new species, *Polyonyx vermicola* Ng and Sasekumar, 1993 (Ng and Sasekumar 1993). The associated scale worm is described herein as a new species of Eulepethidae.

According to Pettibone (1969, 1986), eulepethid scaleworms are characterized by a unique type of branchial cirri found only on non-elytrigerous chaetigers;

parapodia having characteristic hooked notoaciculae, hammer-shaped neuroaciculal distal plates, and stout, bent notochaetae; and a pygidium having a single long, minutely papillate anal cirrus. The prostomium and first tentacular segment are withdrawn into segments 2–4, and segment 3 is fused middorsally with the adjacent segments.

Eulepethid scaleworms have been recorded from several regions in the southern and western Pacific. These worms include *Eulepethus hamifera* (Grube, 1875) from the Philippines, Gulf of Tonkin, and East China Sea (Grube 1875; Pettibone 1969, 1986; Uschakov 1972); *Mexieulepis amioi* (Imajima, 1974) from Japan (Imajima 1974; Pettibone 1986); and *Pareulepis malayana* (Horst, 1913) from the Malay Archipelago (Horst 1913; Pettibone 1969, 1986). The new species is the fourth record of eulepethid scaleworm from the region and the second record of possible commensalism in the family following the association of *Grubeulepis geayi* (Fauvel, 1918) with the acoetid polychaete, *Acoetes melanotus* (Grube, 1876) at Madagascar (Day 1962).

### Systematics

Genus *Grubeulepis* Pettibone, 1969

*Grubeulepis malayensis* n. sp.

(Figs 1–4)

**Materials.** Holotype (CMNH-ZW-248; Coastal Museum of Natural History, Katsuura, Chiba) and a paratype (Department of Zoology, University of Malaya), sandy flat, Morib Beach, Malaysia, 5 December 1996, coll. A. Sasekumar.

**Description.** Holotype 30 mm long for 38 segments, 8 mm wide excluding chaetae, 10 mm wide including chaetae, tapering posteriorly. Paratype similar, 28 mm long for 40 segments, 8 mm wide including chaetae. Sex of type specimens unknown. Elytra and elytrophores 12 pairs on segments 2, 4, 5, 7, 9, 11, 13, 15, 17, 19, 21, 24; first pair oval without papillae (Fig. 1A); rest of elytra becoming more elongate posteriorly, with 5–16 lateral fimbriate processes arranged between anterior and posterior rounded lobes; processes non-articulated (Fig. 1B–G). Branchiae 10 pairs on segments 6, 8, 10, 12, 14, 16, 18, 20, 22, 23, inflated, with distal branchial cirrus (Fig. 2I). Dorsal cirri 2 pairs, on segments 3 and 6, subulate (Fig. 2G). Posterior dorsal lamellae beginning on segment 26, subcordiform to subconical (Fig. 2J).

Prostomium covered by segment 2; median antenna short, oval, arising anterodorsally on prostomium; lateral antennae conical, nearly triangular, arising terminally; palps elongate-tapered, extending beyond tentacular cirri; one pair of small eyes anterolaterally; nuchal organs short, lateral to prostomium (Fig. 2A). Tentacular parapodia (segment 1) narrower basely, enlarged distally, each with dorsal and ventral tentacular cirri subequal in length, 2 aciculae, and 2 bundles of spinous capillary chaetae (Fig. 2D). Ventral buccal cirri on segment 1 (Fig. 2E) thicker and larger than those following (Fig. 2F).

Parapodia biramous, supported by pale amber-colored noto- and neuropodial aciculae. Notopodial aciculae with hooked tips. Notopodial capillary chaetae spinous, forming long, spreading bundles emerging from posterior parts of notopodia. Stout, pale amber-colored notopodial hooks beginning on segment 2, spinous, tapering distally to either fine or flattened, spatulate tips (Figs 3E, 4A–E). Neuropodial aciculae with hammer-shaped distal plates (Fig. 4F).

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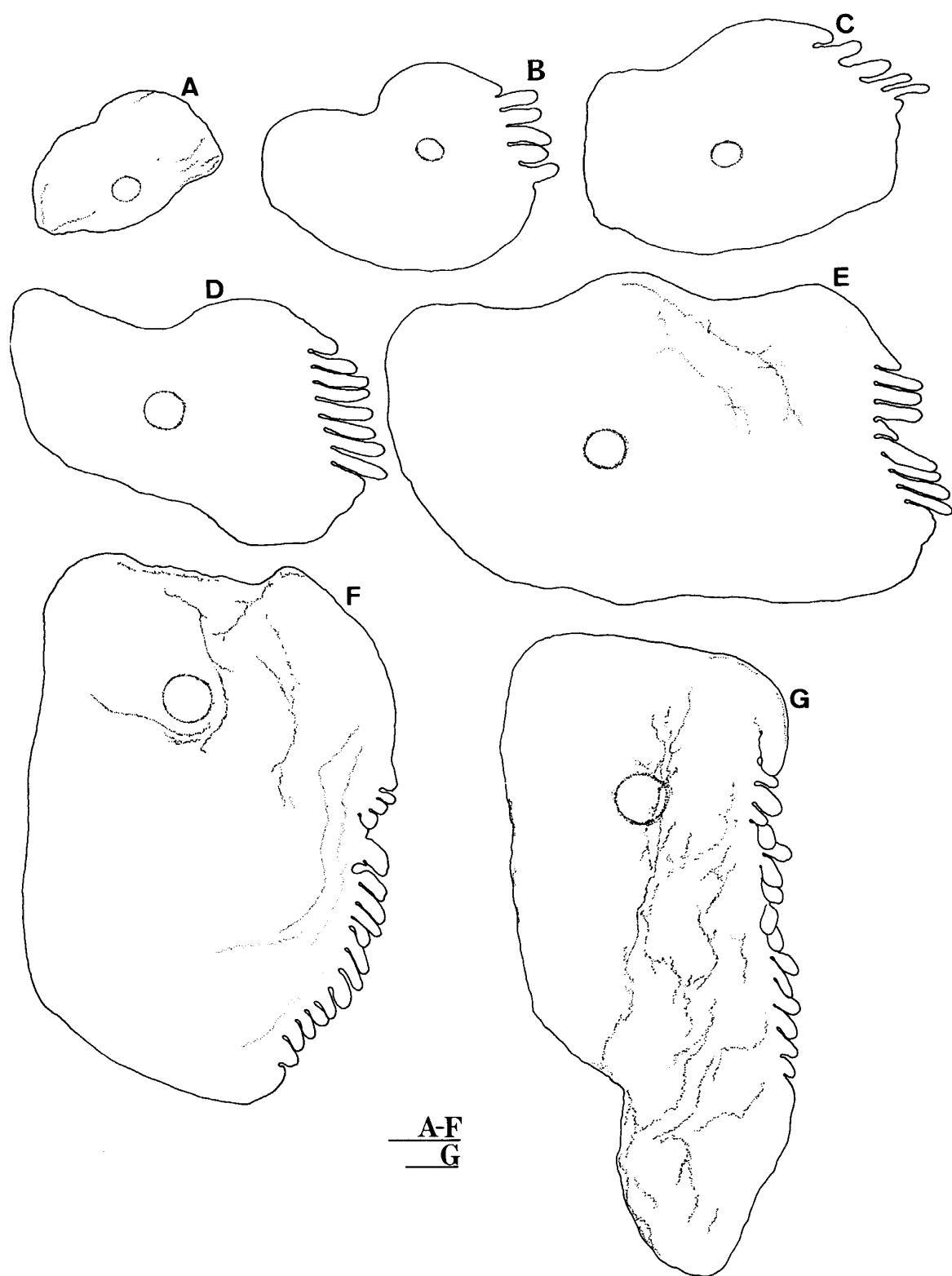


Fig. 1. *Grubeulepis malayensis* n. sp., right elytra of holotype. A-D, elytra 1-4; E, F, G, elytra 6, 11, and 12, respectively. Scales: A-G=0.5 mm.

Neurochaetae of several kinds: 1–2 upper pectinate chaetae (Fig. 3C); flattened chaetae with long, tapered tips on anterior parapodia (Fig. 3B); simple chaetae with pseudo-articulation (Fig. 3A); lower neurochaetae with rows of spinules (Fig. 3D); limbate and non-limbate chaetae with tapering tips; 1–2 dark, acicular neurochaetae each on segments 2–5. Upper neurochaetae of posterior region much stouter than lower ones, curved downwards, tapering to fine tips, finely spinous along bend. Pygidium with single short, smooth anal cirrus on right side (Fig. 2J). Pharynx not extended in types, shown extracted from trunk (Fig. 2B, C), with 20 pairs of elongate papillae and 2 pairs of plate-like chitinous ridges (jaws) (Fig. 2C).

**Habitat.** Living in empty parchment tubes of the chaetopterid *Mesochaetopterus selangolus*.

**Etymology.** The species is named *malayensis* for the type locality, Malaysia.

**Remarks.** The diagnostic characters of the ten described species of *Grubeulepis* are summarized in Table 1. *Grubeulepis malayensis* is characterized by the number of branchiae, the absence of papillae on the first elytra, the segment in which the posterior lamellae first appear, and the spinous notopodial hooks (Table 1).

It is unique in being the only known member of its genus with only a short pygidial cirrus rather than an elongated pygidial cirrus or one of each. When only one cirrus is present, it is long and on the right side. If a short cirrus is also present, it is on the left side. *Grubeulepis malayensis* is most similar to *G. ecuadorensis* Pettibone, 1969 and *G. westoni* Pettibone, 1986. It can be distinguished from *G. ecuadorensis* by the presence of spinous notopodial hooks and from *G. westoni* by the number of segments with acicular neurochaetae. The presence of a single pair of eyes in *G. malayensis* is an additional unique character within the genus; *G. ecuadorensis* has three pairs and *G. westoni* has two to three pairs (Pettibone 1969, 1986).

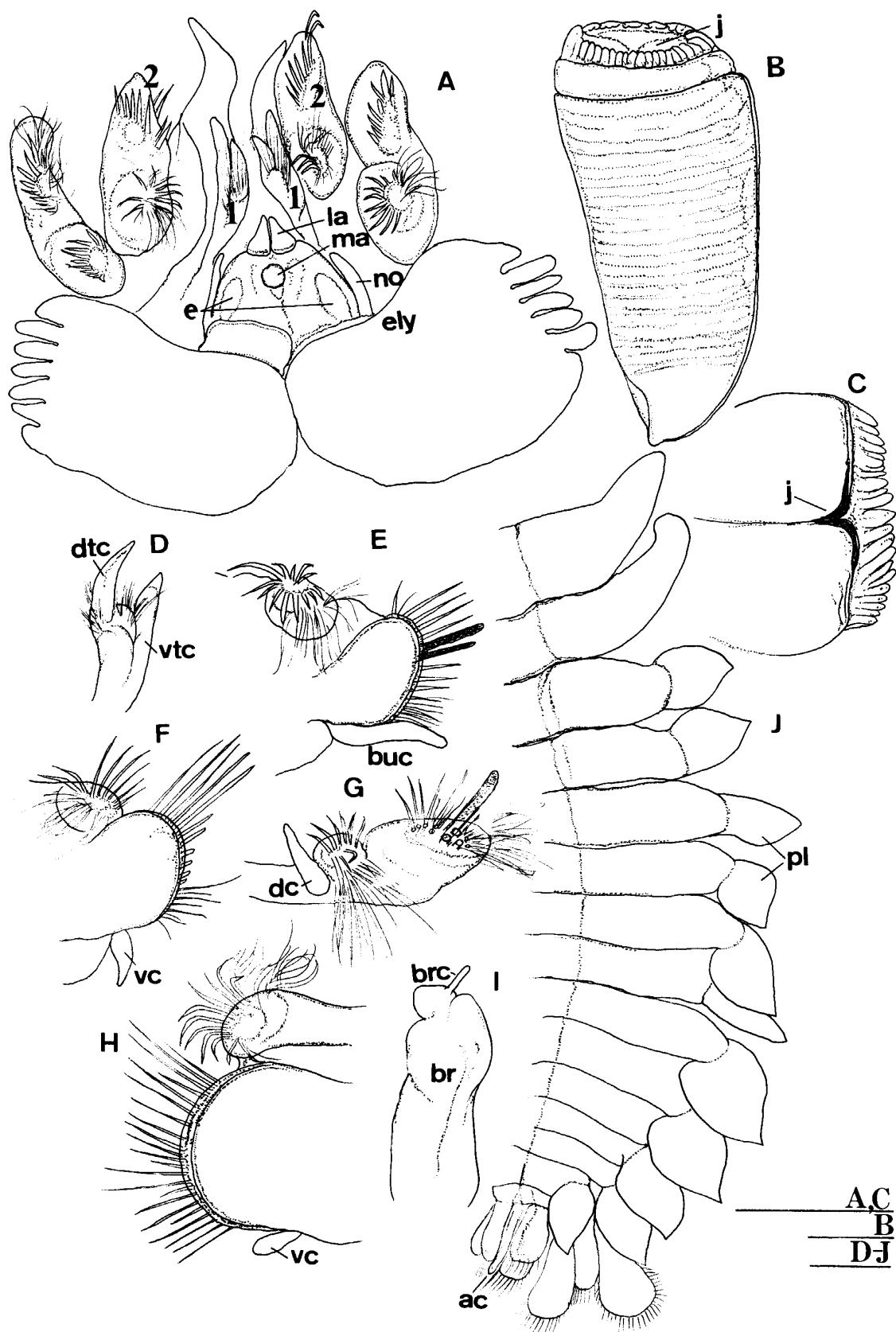
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Fig. 2. *Grubeulepis malayensis* n. sp., holotype. A, dorsal view of anterior end with elytra 2; B, extended pharynx, ventral view; C, distal right half of pharynx, inner view; D, right tentaculophore (segment 1), outer view; E–H, right elytrigerous parapodia of segments 2(E), 3(G), 5(F), and 7(H); I, branchiae of right cirrigerous parapodium of segment 14, dorsal view; J, posterior region of body, segments 24 to 38, dorsal view. Scales: A–C=1 mm; D–J=0.5 mm. Abbreviations: ac, anal cirrus; br, branchia; brc, branchial cirrus; buc, buccal cirrus; dc, dorsal cirrus; dtc, dorsal tentacular cirrus; e, eye; ely, elytron; j, jaw; la, lateral antenna; ma, median antenna; no, nuchal organ; pl, posterior lamella; vc, ventral cirrus; vtc, ventral tentacular cirrus; 1, segment 1; 2, segment 2.

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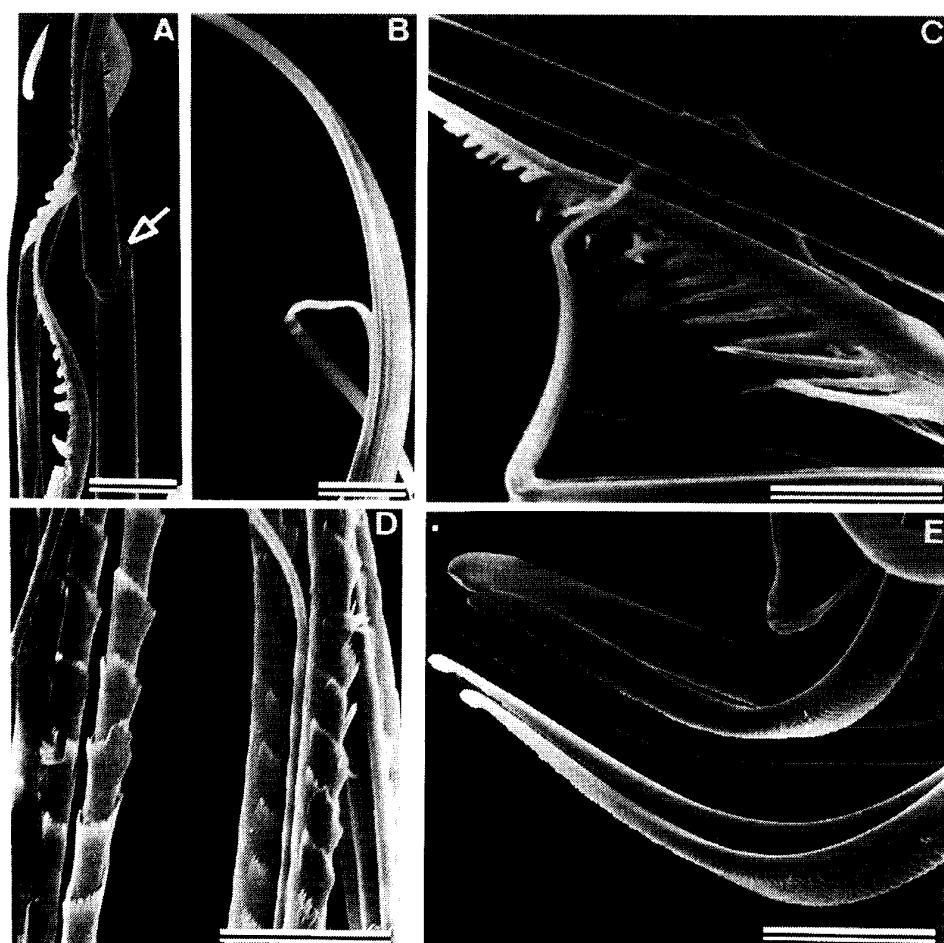


Fig. 3. *Grubeulepis malayensis* n. sp., scanning electron micrographs of chaetae of segments 5 and 13 of paratype. A, pectinate and slender chaetae, latter with pseudoarticulation (arrow); B, long, curved upper neurochaetae of segment 5; C, pectinate neurochaetae of segment 5; D, lower neurochaetae of segment 13; E, dorsal notopodial hooks of segment 5. Scales: A, B, E=50  $\mu$ m; C=30  $\mu$ m; D=20  $\mu$ m.

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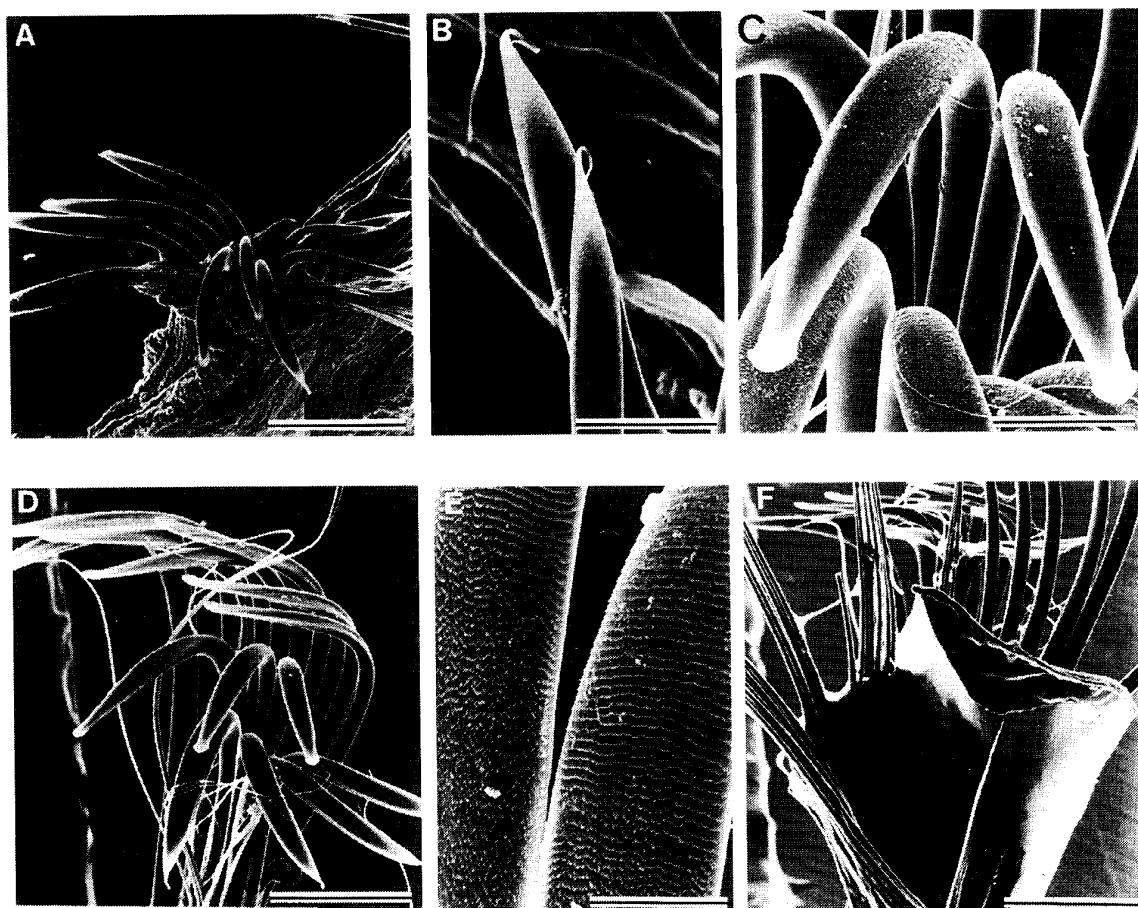


Fig. 4. *Grubeulepis malayensis* n. sp., scanning electron micrographs of chaetae of segments 13 and 31 of paratype. A–C, notopodial hooks of segment 13; A, entire group; B, detail of hooks of lower row; C, detail of dorsal surface of hooks of upper row. D–F, notopodial hooks of segment 31; D, entire group; E, detail of surface of hook of upper row; F, ventral view of neuropodium showing triangular tip of acicula. Scales: A=250  $\mu$ m; B, C=50  $\mu$ m; D=150  $\mu$ m; E=30  $\mu$ m; F=200  $\mu$ m.

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Table 1. Comparison of species of *Grubeulepis*. Data summarized mainly from Pettibone (1969, 1986), supported by Berkeley and Berkeley (1939) and Jones (1962)

Character	<i>fimbriata</i> (Treadwell, 1901)	<i>ecuadorensis</i> Pettibone, 1969	<i>westoni</i> Pettibone, 1986	<i>geayi</i> (Fauvel, 1918)	<i>malayensis</i> n. sp. Nishi	<i>mexicana</i> (Berkeley and Pettibone, Berkeley, 1939)	<i>katzmanni</i> Pettibone, 1986	<i>sulcatusis</i> (Jones, 1962)	<i>augeneri</i> Pettibone, 1969	<i>tebbhei</i> Pettibone, 1969
Length of body in mm	14-24	35	30-40	21-40	28-30	>33	6-9	9.5-10	11.5-17	13-17
Width of body in mm	4-6	8	6-8	5-8	8	>9	2	2.4	3.5-4	4
without chaetae										
No. of segments	37-38	40	38-40	?	38-40	>37	29-31	32	33	33
Papillae on first elytra	2 clavate	absent	absent	3-4	absent	about 7	>17	about 7	11-12	about 8
No. of lateral leaflike processes on elytra	5-17	4-13	3-20	?	4-16	3-25	1-6	4-10	3-8	4-12
No. of lateral leaflike processes on 12th elytra	15-17	13	13-20	17 or 21	16	25	6	10	8	12
Eyes	2 pairs	3 pairs	2-3 pairs	absent	1 pair	3-5 pairs	3 pairs?	3 pairs	2 pairs	2 pairs
Lateral processes of elytra	not articulate	not articulate	not articulate	not articulate	not articulate	biarticulate, some tripartite	wide, oval	biarticulate	biarticulate	biarticulate
No. of branchial pairs	12	12	12-13	13	10	11	11	10	12 or 13	11
posterior lamellae (P1)	subconical? subcordiform to subconical	conical	subreniform to subconical	subcordiform to subconical	oval to lanceolate	conical	pyriform to subcordiform	subconical to lanceolate	subcordiform to lanceolate	subcordiform to lanceolate
P1 first appear on segment	28	28	28 or 29	28	26	27	27	26	28 or 29	27
Acicular neurosetae on segments	absent	3-8	3	3-4	2-5	absent	?	absent	absent	?
Notopodial hooks	spinous	smooth	spinous	spinous	spinous	smooth	?	?	smooth	smooth
Anal cirri	long, on right side	long, on right side	long on right, short on left	long on right, short on left	short on right side	long on right, right side	?	?	long on right, short on left	long on right, short on left
Type locality	Puerto Rico	Ecuador	North	Mexico	Malaysia	Jamaica	Adriatic	West Africa	West Africa	West Africa
					Carolina	Sea				

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